Amendments to the claims

This listing of claims will replace all prior versions and listings of the claims.

Listing of Claims:

1. (Currently Amended) A liquid stereolithography resin comprising a first urethane acrylate oligomer, a first acrylate monomer, ~~and~~ a polymerization modifier, a second urethane acrylate oligomer, and a stabilizer; wherein the first urethane acrylate oligomer is ~~CN964~~ an aliphatic polyester based urethane diacrylate oligomer, ~~CN963~~ a hard aliphatic urethane acrylate oligomer, ~~CN966, CN990~~ an aliphatic urethane containing bound silicone, or ~~CN973~~ an aromatic urethane acrylate oligomer.

2. (Original) The liquid stereolithography resin of claim 1, further comprising a photoinitiator.

3. (Original) The liquid stereolithography resin of claim 2, wherein the photoinitiator includes a phosphine oxide, an alpha-hydroxyketone, and a benzophenone derivative.

4. (Previously presented) The liquid stereolithography resin of claim 2, wherein the photoinitiator includes a component selected from the group consisting of a benzophenone, a benzil dimethyl ketal, a 1-hydroxy-cyclohexylphenylketone, an isopropyl thioxanthone, an ethyl 4-(dimethylamino)benzoate, a blend of 2,4,6-trimethylbenzoyldiphenyl phosphine oxide, 2,4,6-trimethylbenzophenone, 4-methylbenzophenone, and oligo(2-hydroxy-2-methyl-1-(4-(1-methylvinyl)phenyl)propanone, a benzoin normal butyl ether, a blend of oligo(2-hydroxy-2-methyl-1-(4- (1-methylvinyl)phenyl) propanone) and poly(2-hydroxy-2-methyl-1-phenyl-1-propanone), tripropyleneglycol diacrylate, an oligo(2-hydroxy-2-methyl-1-(4-(1-methylvinyl)phenyl)propanone), a 2-hydroxy-2-methyl-1-phenyl-1-propanone, a poly(2-hydroxy-2-methyl-1-phenyl-1-propanone), a trimethylolpropane triacrylate, a mixture of 2,4,6-

trimethylbenzophenone and 4-methylbenzophenone, a phosphine oxide, a 4-methylbenzophenone, a trimethylbenzophenone, a methylbenzophenone, and a blend of 2,4,6-trimethylbenzoyl-diphenyl-phosphineoxide and hydroxy-2-methyl-1-phenyl-propan-1-one.

5. (Previously presented) The liquid stereolithography resin of claim 2, wherein the photoinitiator includes a component selected from the group consisting of a blend of 2,4,6-trimethylbenzoyl-diphenyl-phosphineoxide and hydroxy-2-methyl-1-phenyl-propan-1-one, a phosphine oxide, a 2-hydroxy-2-methyl-1-phenyl-1-propanone, and mixtures thereof.

6. (Original) The liquid stereolithography resin of claim 2, wherein the photoinitiator activates polymerization of an acrylate in a wavelength range of 240 nm to 250 nm, 360 nm to 380 nm, or 390 nm to 410 nm.

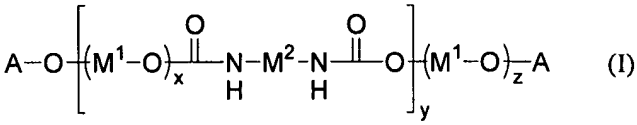
7. (Original) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer includes a polyester urethane diacrylate.

8. (Original) The liquid stereolithography resin of claim 7, wherein the polyester urethane diacrylate is an aliphatic polyester urethane diacrylate.

9. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first acrylate monomer includes a monovalent acrylate.

10. (Original) The liquid stereolithography resin of claim 1, wherein the first acrylate monomer includes a polyvalent acrylate.

11. (Original) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer has formula (I):



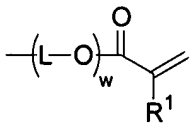
(I)

wherein

each M^1 is, independently, an alkylene, an acylalkylene, an oxyalkylene, an arylene, an acylarylene, or an oxyarylene, M^1 being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, silicone, aryl, or aralkyl,

each M^2 is, independently, an alkylene or an arylene, M^2 being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, silicone, aryl, or aralkyl,

each A, independently, has the formula:



wherein R^1 is hydrogen or lower alkyl, each L is, independently, C_1-C_4 alkyl, and w is an integer ranging from 0 to 20, and

x is a positive integer less than 40, y is a positive integer less than 100, z is a positive integer less than 40, and w, x, y, and z together are selected such that the molecular weight of the first urethane acrylate oligomer is less than 20,000.

12. (Original) The liquid stereolithography resin of claim 11, wherein M^1 is a straight, branched, or cyclic alkylene.

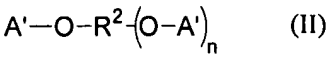
13. (Withdrawn) The liquid stereolithography resin of claim 11, wherein M^1 is an acylalkylene or acylarylene.

14. (Withdrawn) The liquid stereolithography resin of claim 13, wherein M^2 is a straight, branched, or cyclic alkylene.

15. (Original) The liquid stereolithography resin of claim 11, wherein M^2 is a straight, branched, or cyclic alkylene.

16. (Original) The liquid stereolithography resin of claim 11, wherein L is branched or unbranched C_1-C_4 alkyl.

17. (Original) The liquid stereolithography resin of claim 11, wherein the first acrylate monomer has formula (II):



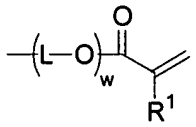
(II)

wherein

R^2 is a monovalent or polyvalent moiety selected from the group consisting of a C_1-C_{12} aliphatic group, an aromatic group, and a poly(C_1-C_4 branched or unbranched alkyl ether), R^2 being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, aryl, or aralkyl,

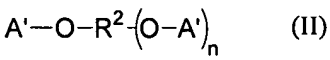
n is an integer ranging from 0 to 5, and

each A' has the formula:



wherein R^1 is hydrogen or lower alkyl, each L independently is C_1-C_4 alkyl, and w is an integer ranging from 0 to 20.

18. (Original) The liquid stereolithography resin of claim 1, wherein the first acrylate monomer has formula (II):



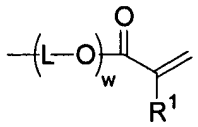
(II)

wherein

R^2 is a monovalent or polyvalent moiety selected from the group consisting of a C_1-C_{12} aliphatic group, an aromatic group, and a poly(C_1-C_4 branched or unbranched alkyl ether), R^2 being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, aryl, or aralkyl,

n is an integer ranging from 0 to 5, and

each A' has the formula:

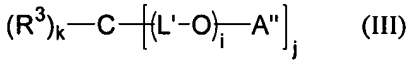


wherein R^1 is hydrogen or lower alkyl, each L independently is C_1-C_4 alkyl, and w is an integer ranging from 0 to 20.

19. (Original) The liquid stereolithography resin of claim 18, wherein L is branched or unbranched C_1-C_4 alkyl.

20. (Original) The liquid stereolithography resin of claim 1, wherein the polymerization modifier includes a second acrylate monomer.

21. (Original) The liquid stereolithography resin of claim 20, wherein the second acrylate monomer has formula (III):



(III)

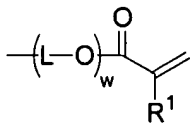
wherein

j is 1, 2, 3 or 4,

k is equal to 4-j,

R^3 is hydrogen or C_1-C_4 branched or unbranched alkyl, each L' independently is C_1-C_4 branched or unbranched alkyl, each i independently is 0, 1, 2 or 3, and

each A" independently has the formula:



wherein R^1 is hydrogen or lower alkyl, each L independently is C_1-C_4 branched or unbranched alkyl, and w is an integer ranging from 0 to 20.

22. (Cancelled)

23. (Original) The liquid stereolithography resin of claim 1, wherein the polymerization modifier is selected from the group consisting of a trimethylolpropane triacrylate, a bisphenol A dimethacrylate, a tripropyleneglycol diacrylate, a pentaerythritol tetraacrylate, a 2-(2-ethoxyethoxy)ethylacrylate, a tris(2-hydroxyethyl)isocyanurate triacrylate, an isobornyl acrylate, and mixtures thereof.

24. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the polymerization modifier includes isobornyl acrylate.

25. (Cancelled)

26. (Currently Amended) The liquid stereolithography resin of claim ~~25~~ 1, wherein the stabilizer is selected from the group consisting of (bis(1,2,2,6,6-pentamethyl-4-piperidyl)sebacate and 1-methyl-10-(1,2,2,6,6-pentamethyl-4-piperidyl)sebacate), (bis(1,2,2,6,6-pentamethyl-4-piperidyl)sebacate), MEQH (4-methoxyphenol), 2-(2'-hydroxy-5'-methylphenyl)benzotriazole, 1,2,2,6,6-pentamethyl-4-piperidyl methacrylate and (2-hydroxy-4-octyloxybenzophenone).

27. (Currently Amended) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~CN964~~ an aliphatic polyester based urethane diacrylate oligomer, the first acrylate monomer is ethoxylated (3) trimethylolpropane acrylate, and the polymerization modifier is selected from the group consisting of isobornyl acrylate, ethoxylated (5) pentaerythritol tetraacrylate, ~~CN965~~ an aliphatic urethane acrylate, tris-(2-hydroxyethyl)isocyanurate triacrylate, and mixtures thereof.

28. (Currently Amended) The liquid stereolithography resin of claim 27, wherein the resin includes 5-35 weight % ~~CN964~~ an aliphatic polyester based urethane diacrylate oligomer and 0.5-25 weight % ethoxylated (3) trimethylolpropane acrylate.

29. (Withdrawn) The liquid stereolithography resin of claim 28, wherein the resin includes 0.5-20 weight % isobornyl acrylate.

30. (Previously presented) The liquid stereolithography resin of claim 28, wherein the resin includes 15-45 weight % ethoxylated (5) pentaerythritol tetraacrylate.

31. (Currently Amended) The liquid stereolithography resin of claim 28, wherein the resin includes 0.5-25 weight % ~~CN965~~ an aliphatic urethane acrylate.

32. (Withdrawn) The liquid stereolithography resin of claim 28, wherein the resin includes 5-35 weight % tris-(2-hydroxyethyl)isocyanurate triacrylate.

33. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~CN963~~ hard aliphatic urethane acrylate oligomer, the first acrylate monomer is tripropyleneglycol diacrylate, and the polymerization modifier is selected from the group of CN970H75, ethoxylated (4) bisphenol A dimethyacrylate, isobornyl acrylate, and mixtures thereof.

34. (Withdrawn) The liquid stereolithography resin of claim 33, wherein the resin includes 40-70 weight % ~~CN963~~ hard aliphatic urethane acrylate oligomer, and 5-35 weight % tripropyleneglycol diacrylate.

35. (Withdrawn) The liquid stereolithography resin of claim 34, wherein the resin includes 0.5-15 weight % CN970H75.

36. (Withdrawn) The liquid stereolithography resin of claim 34, wherein the resin includes 0.5-15 weight % ethoxylated (4) bisphenol A dimethyacrylate.

37. (Withdrawn) The liquid stereolithography resin of claim 34, wherein the resin includes 5-35 weight % isobornyl acrylate.

38. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~CN966~~ an aliphatic polyester based urethane diacrylate, the first acrylate monomer is isobornyl acrylate, and the polymerization modifier is selected from the group consisting of isobornyl acrylate, ethoxylated (4) bisphenol A dimethyacrylate, and mixtures thereof.

39. (Withdrawn) The liquid stereolithography resin of claim 38, wherein the resin includes 10-40 weight % ~~CN966~~ an aliphatic polyester based urethane diacrylate and 0.5-25 weight % isobornyl acrylate.

40. (Withdrawn) The liquid stereolithography resin of claim 38, wherein the resin includes 6-35 weight % isobornyl acrylate.

41. (Withdrawn) The liquid stereolithography resin of claim 38, wherein the resin includes 25-55 weight % ethoxylated (4) bisphenol A dimethyacrylate.

42. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~CN990~~ an aliphatic urethane containing bound silicone, the first acrylate monomer is isobornyl acrylate, and the polymerization modifier is selected from the group consisting of CN131, a polyether modified acryl functional polydimethylsiloxane, and mixtures thereof.

43. (Withdrawn) The liquid stereolithography resin of claim 42, wherein the resin includes 50-80 weight % ~~CN990~~ an aliphatic urethane containing bound silicone and 0.5-20 weight % isobornyl acrylate.

44. (Withdrawn) The liquid stereolithography resin of claim 43, wherein the resin includes 5-35 weight % CN131.

45. (Withdrawn) The liquid stereolithography resin of claim 43, wherein the resin includes 0.5-15 weight % a polyether modified acryl functional polydimethylsiloxane.

46. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~CN973~~ an aromatic urethane acrylate oligomer, the first acrylate monomer is isobornyl acrylate, and the polymerization modifier is isobornyl acrylate.

47. (Withdrawn) The liquid stereolithography resin of claim 46, wherein the resin includes 45-75 weight % ~~CN973~~ an aromatic urethane acrylate oligomer and 10-70 weight % isobornyl acrylate.

48. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~CN963~~ hard aliphatic urethane acrylate oligomer, the first acrylate monomer is tripropylene glycol diacrylate, and the polymerization modifier is selected from the group consisting of CN2400, isobornyl acrylate, and mixtures thereof.

49. (Withdrawn) The liquid stereolithography resin of claim 48, wherein the resin includes 20-50 weight % ~~CN963~~ hard aliphatic urethane acrylate oligomer and 0.5-25 weight % tripropylene glycol diacrylate.

50. (Withdrawn) The liquid stereolithography resin of claim 49, wherein the resin includes 10-40 weight % CN2400.

51. (Withdrawn) The liquid stereolithography resin of claim 49, wherein the resin includes 10-40 weight % isobornyl acrylate.

52. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~CN966~~ an aliphatic polyester based urethane diacrylate, the first acrylate monomer is isobornyl acrylate, and the polymerization modifier is selected from the

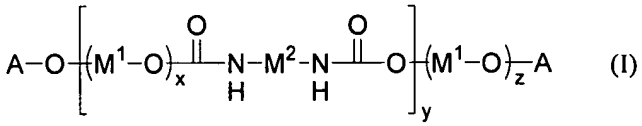
group consisting of ~~CN131~~ a low viscosity aromatic monoacrylate oligomer and isobornyl acrylate.

53. (Withdrawn) The liquid stereolithography resin of claim 52, wherein the resin includes 35-60 weight % ~~CN966~~ an aliphatic polyester based urethane diacrylate and 10-25 weight % isobornyl acrylate.

54. (Withdrawn) The liquid stereolithography resin of claim 52, wherein the resin includes 10-45 weight % isobornyl acrylate.

55. (Withdrawn) The liquid stereolithography resin of claim 52, wherein the resin includes 5-35 weight % ~~CN131~~ low viscosity aromatic monoacrylate oligomer.

56. (Currently Amended) A liquid stereolithography resin comprising:
a first urethane acrylate oligomer having formula (I):



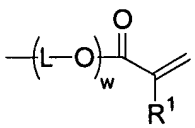
(I)

wherein

each M^1 is, independently, an alkylene, an acylalkylene, an oxyalkylene, an arylene, an acylarylene, or an oxyarylene, M^1 being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, silicone, aryl, or aralkyl,

each M^2 is, independently, an alkylene or an arylene, M^2 being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, silicone, aryl, or aralkyl,

each A, independently, has the formula:

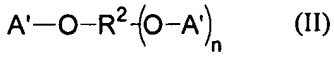


wherein R^1 is hydrogen or lower alkyl, each L is, independently, C_1-C_4 alkyl, and w is an integer

ranging from 0 to 20, and

x is a positive integer less than 40, y is a positive integer less than 100, z is a positive integer less than 40, and w, x, y, and z together are selected such that the molecular weight of the first urethane acrylate oligomer is less than 20,000;

a first acrylate monomer having formula (II):



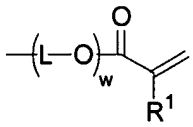
(II)

wherein

R^2 is a monovalent or polyvalent moiety selected from the group consisting of a C_1-C_{12} aliphatic group, an aromatic group, and a poly(C_1-C_4 branched or unbranched alkyl ether), R^2 being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, aryl, or aralkyl,

n is an integer ranging from 0 to 5, and

each A' has the formula:



wherein R^1 is hydrogen or lower alkyl, each L independently is C_1-C_4 alkyl, and w is an integer ranging from 0 to 20; and

a polymerization modifier including a second urethane acrylate oligomer~~, a second acrylate monomer, or a combination thereof~~, and a stabilizer.

57. (Original) The liquid stereolithography resin of claim 56, further comprising a photoinitiator and a stabilizer.

58-67. (Cancelled)

68. (New) A liquid stereolithography resin comprising an aliphatic polyester based urethane diacrylate oligomer, an ethoxylated (3) trimethylolpropane acrylate, and a polymerization modifier selected from the group consisting of isobornyl acrylate, ethoxylated (5)

pentaerythritol tetraacrylate, an aliphatic urethane acrylate, tris-(2-hydroxyethyl)isocyanurate triacrylate, and mixtures thereof.

69. (New) The liquid stereolithography resin of claim 1, further comprising a photoinitiator.

70. (New) The liquid stereolithography resin of claim 69, wherein the photoinitiator includes a phosphine oxide, an alpha-hydroxyketone, and a benzophenone derivative.

71. (New) The liquid stereolithography resin of claim 69, wherein the photoinitiator includes a component selected from the group consisting of a benzophenone, a benzil dimethyl ketal, a 1-hydroxy-cyclohexylphenylketone, an isopropyl thioxanthone, an ethyl 4-(dimethylamino)benzoate, a blend of 2,4,6-trimethylbenzoyldiphenyl phosphine oxide, 2,4,6-trimethylbenzophenone, 4-methylbenzophenone, and oligo(2-hydroxy-2-methyl-1-(4-(1-methylvinyl)phenyl)propanone, a benzoin normal butyl ether, a blend of oligo(2-hydroxy-2-methyl-1-(4- (1-methylvinyl)phenyl) propanone) and poly(2-hydroxy-2-methyl-1-phenyl-1-propanone), tripropyleneglycol diacrylate, an oligo(2-hydroxy-2-methyl-1-(4-(1-methylvinyl)phenyl)propanone), a 2-hydroxy-2-methyl-1-phenyl-1-propanone, a poly(2-hydroxy-2-methyl-1-phenyl-1-propanone), a trimethylolpropane triacrylate, a mixture of 2,4,6-trimethylbenzophenone and 4-methylbenzophenone, a phosphine oxide, a 4-methylbenzophenone, a trimethylbenzophenone, a methylbenzophenone, and a blend of 2,4,6-trimethylbenzoyl-diphenyl-phosphineoxide and hydroxy-2-methyl-1-phenyl-propan-1-one.

72. (New) The liquid stereolithography resin of claim 69, wherein the photoinitiator includes a component selected from the group consisting of a blend of 2,4,6-trimethylbenzoyl-diphenyl-phosphineoxide and hydroxy-2-methyl-1-phenyl-propan-1-one, a phosphine oxide, a 2-hydroxy-2-methyl-1-phenyl-1-propanone, and mixtures thereof.

73. (New) The liquid stereolithography resin of claim 69, wherein the photoinitiator activates polymerization of an acrylate in a wavelength range of 240 nm to 250 nm, 360 nm to 380 nm, or 390 nm to 410 nm.

74. (New) The liquid stereolithography resin of claim 68, wherein the first acrylate monomer includes a polyvalent acrylate.

75. (New) The liquid stereolithography resin of claim 68, wherein the polymerization modifier includes a second acrylate monomer.

76. (New) The liquid stereolithography resin of claim 68, wherein the polymerization modifier includes a second urethane acrylate oligomer.

77. (New) The liquid stereolithography resin of claim 68, wherein the polymerization modifier is selected from the group consisting of a trimethylolpropane triacrylate, a bisphenol A dimethacrylate, a tripropyleneglycol diacrylate, a pentaerythritol tetraacrylate, a 2-(2-ethoxyethoxy)ethylacrylate, a tris(2-hydroxyethyl)isocyanurate triacrylate, an isobornyl acrylate, and mixtures thereof.

78. (New) The stereolithography resin of claim 68, further comprising a stabilizer.

79. (New) The liquid stereolithography resin of claim 78, wherein the stabilizer is selected from the group consisting of (bis(1,2,2,6,6-pentamethyl-4-piperidyl)sebacate and 1-methyl-10-(1,2,2,6,6-pentamethyl-4-piperidyl)sebacate), (bis(1,2,2,6,6-pentamethyl-4-piperidyl)sebacate), MEQH (4-methoxyphenol), 2-(2'-hydroxy-5'-methylphenyl)benzotriazole, 1,2,2,6,6-pentamethyl-4-piperidyl methacrylate and (2-hydroxy-4-octyloxybenzophenone).

80. (New) The liquid stereolithography resin of claim 68, wherein the resin includes 5-35 weight % an aliphatic polyester based urethane diacrylate oligomer and 0.5-25 weight % ethoxylated (3) trimethylolpropane acrylate.

81. (New) The liquid stereolithography resin of claim 68, wherein the resin includes 15-45 weight % ethoxylated (5) pentaerythritol tetraacrylate.

82. (New) The liquid stereolithography resin of claim 688, wherein the resin includes 0.5-25 weight % an aliphatic urethane acrylate.

83. (New) The liquid stereolithography resin of claim 56, wherein the polymerization modifier further includes a-second acrylate monomer.